

first gonopods is shorter and is distally truncate, while the second gonopods are more decidedly different. *Canadensis* is a darker species which may be at once distinguished in both sexes from the present one by the much longer and more strongly and abruptly decurved spinous tip to the anal scutum. The wide separation of the small repugnatorial pore from the suture is a characteristic of importance.

This species is represented in the collection by numerous specimens.

13. **Polydesmus serratus** Say.

Polydesmus canadensis Newport.

This common *Polydesmus* is represented by numerous specimens.

14. **Branneria carinatum** Bollman.

Two specimens; the first to be added to the few specimens in the collection of the author of the species.

SOME NOTES ON PARASITISM OF CHRYSOPIDS IN SOUTH CAROLINA.

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In 1890 Dr. Howard published notes on "The Parasites of the Hemerobiinae."* In this article the author records *Telenomus* sp. as an egg parasite of "either *Chrysopa* or *Hemerobius*." As secondary parasites reared from larvæ or cocoons, † he mentions *Hemiteles hemerobiicola* Ashm., *H. rufiventris* Riley and *Mesochorus (?) chrysopæ* Ashm. At that time Doctor Howard prophesied that several species of the proctotrupid *Helorus* would eventually be found to be primary parasites of Chrysopids. This prediction has been substantiated by the present writer's work. Moreover, the two rearings of *Isodromus iceryæ* at Batesburg, as indicated in Table II, add additional proof to Dr. Howard's

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†Since first preparing this paper on Chrysopid parasites, all of which had been bred from cocoons, we have been able to conduct some observations on Chrysopid eggs. In all 93 eggs were collected, and from these were bred 7 parasites—all of the species *Telenomus chrysopæ* Ashm. Computed on the basis of 7 parasitized eggs out of 93, an estimated egg parasitism of 7.5% is found to obtain. The total parasitism, then, from species issuing from the egg (7.5%), and from species issuing from the cocoon (48.4%), is computed to be about 55.9%.

belief that the species was erroneously described as a parasite of *Icerya purchasi* and is in reality a true parasite of Chrysopids.

Certain studies of red-spider predators were conducted at Batesburg, South Carolina, during the season of 1913, and it was noticed that a considerable percentage of the Chrysopas were parasitized.



Fig. 26—Apical portion of cotton plant, showing the characteristic location of Chrysopid cocoon at C.

In order to determine the approximate percentage of parasitism of these very beneficial insects Mr. F. L. McDonough, of the Bureau of Entomology, and the writer, collected a large series of cocoons from cotton plants growing in the fields. Adults from these cocoons were reared in the laboratory under conditions as nearly normal as possible.

It is worth recording, since we have never noticed it in print,

that the Chrysopas in cotton fields pupate very characteristically in the apical buds at the very terminal portion of the stalk. The pubescence of the nascent foliage at this point is densely concentrated and of a grayish appearance, thus approximating the texture of the cocoon and affording considerable protection for it. This is shown in the accompanying figure. Of course, occasional cocoons are found in other locations, as, for example, within the involucre bracts of "squares" or in the convolutions of leaves. These are exceptions.

All of the several lots of Chrysopid cocoons collected were observed daily until they either produced adults or parasites, or until they clearly indicated that they were not going to give issue to anything. The final summary of results from this detailed study—in the case of the largest lot—is shown in Table 1.

TABLE I.—Estimated Parasitism of Chrysopids.

Chrysopid cocoons observed.....	99
Cocoons yielding Chrysopids.....	51
Cocoons yielding parasites.....	48
Percentage of parasitism.....	48.4%

A lot of about 100 bred Chrysopids were determined by Mr.

Nathan Banks, and it developed that there were three species present: *Chrysopa rufilabris* Banks, *C. nigricornis* Burm., and *C. oculata* Say. The great majority of the specimens were *rufilabris*, while but a few individuals of *oculata* and *nigricornis* were present. The superficial appearance of the three species is much alike, and undoubtedly the habits and life histories are likewise in the main the same.

Mr. J. C. Crawford, who has kindly determined the parasite material, states that the collection, which embraces several hundred specimens, is the most extensive that has been obtained from lace-winged flies. He has also determined that three of the species are new to science, and that their descriptions are now in the course of preparation by him. The following table lists the species in the relative order of abundance and indicates the maximum and average number of individuals issuing from a *Chrysopa* cocoon in the case of each species.

TABLE II.—Relative Abundance of Parasites.

Number of lots.	SPECIES.	Maximum No. per lot.	Average No. per lot.
20	<i>Chrysophagus compressicornis</i> Ashm	20	10
15	<i>Perilampus</i> sp.....	1	1
10	<i>Gonicercus</i> sp.....	18	9
2	<i>Isodromus iceryae</i> M.....	3	3
2	<i>Orthizema atriceps</i> Ashm. (1).....	1	1
1	<i>Heiorus</i> sp.....	1	1

(1) Ichneumonid determined by R. A. Cushman.

It is of interest in this connection to record that *Chrysophagus compressicornis*, in addition to being reared frequently from Chrysopids, was reared upon one occasion from an undetermined *Syrphid* pupa. Likewise, from this same *Syrphid* species, were reared the Chalcidoid flies—*Pachyneuron allograptæ* Ashm., and *Syrphophagus mesograptæ* Ashm.